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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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08/807,737

02/27/1997

HISASHI OHTANI

0756-1638

5408

22204

7590

10/02/2002

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EXAMINER

PERT, EVAN T

ART UNIT

PAPER NUMBER

2829

DATE MAILED: 10/02/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	08/807,737		OHTANI ET AL.	
	<b>Examiner</b>		<b>Art Unit</b>	
	Evan T. Pert		2829	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondenc address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 March 2002.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 19-84 is/are pending in the application.
- 4a) Of the above claim(s) 19-59, 63-71, 75-80 and 82 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 60-62, 72-74, 81 and 83 is/are allowed.
- 6) ☒ Claim(s) 84 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 08/391,580.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                          | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>48</u> . | 6) <input type="checkbox"/> Other:  |

It would have been obvious to one of ordinary skill in the art at the time of applicant's claimed invention to modify the method taught by Masumo et al. to include the "disposing and heating of metal in contact with a semiconductor film to crystallize the semiconductor film" as taught by Liu et al.. One of ordinary skill in the art would have been motivated to lower the thermal budget in Masumo et al. by crystallizing with metal in contact with the semiconductor film, such that the glass substrate taught by Masumo et al. could be a lower temperature-rated (less expensive) glass substrate.

***Allowable Subject Matter***

2. Claims 60-62, 72-74, 81 and 83 are allowed.
3. The following is a statement of reasons for the indication of allowable subject matter:

The prior art does not fairly disclose applicant's method of making a semiconductor device particularly characterized by the steps of disposing a solution of metal [claims 60-62 and 81] or a solution of a compound of metal [claims 72-74 and 83] to crystallize an amorphous semiconductor film "on" a silicon nitride film containing at least one of hydrogen and oxygen (with "on" being understood as meaning "in substantial contact with" per pages 4-5 of applicant's specification).

Applicant's methodology allows the channel portion of a device, for example, to be formed so that the crystal orientation is other than a (111) along the channel while lowering thermal budget with a simplified means of applying a metal nucleating material for lowering thermal budget.

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 84 is rejected under 35 U.S.C. 103(a) as being unpatentable over Masumo et al. (U.S. Patent 5,306,651) in view of Liu et al. (U.S. Patent 5,147,826).

Masumo et al. disclose a method of making a semiconductor device comprising the steps of: forming a silicon nitride film containing at least one of hydrogen and oxygen over a substrate [i.e. passivation film 2 as oxynitride which is "silicon nitride containing oxygen" per page 3, lines 21-25 of applicant's disclosure]; depositing an amorphous silicon semiconductor film on the silicon (oxy)nitride film 2 [col. 3, lines 14-17]; heating the semiconductor film to crystallize the amorphous [col. 6, lines 40-43] forming a channel region 11 wherein the channel is formed from the crystallized film [col. 5, lines 18-20].

Masumo et al. do not teach "disposing a metal in contact with at least a selected portion of said semiconductor film AND heating the metal TO CRYSTALLIZE the semiconductor film."

Liu et al. teach that "the deposition of nickel or palladium ultra-thin discontinuous films enhances the nucleation of poly Si" which "lowers the thermal budget" [col. 4, lines 35-48] for the glass substrate.

***Response to Arguments***

4. While applicant's arguments are not persuasive, the rejections relying on Makita et al. are withdrawn in view of applicant's priority perfected to February 1994.

***Conclusion***

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Evan T. Pert whose telephone number is 703-306-5689. The examiner can normally be reached on M-F (7:00-3:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Sherry can be reached on 703-308-1680. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.